

# **ANNUAL REPORT**

**OF**

## **The Director**

**OF THE**

## **South Dakota Agricultural Experiment Station**

**For Year Ending June 30, 1908**

## **Governing Board**

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### **Regents of Education**

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### **Station Staff**

F. A. Spafford.....	Regent Member
A. J. Norby.....	Regent Member
Robert L. Slagle .....	President of the College
James W. Wilson.....	Director and Animal Husbandry
N. E. Hansen.....	Vice-Director and Horticulturist
James H. Shepard.....	Chemist
E. W. Olive.....	Botanist
E. L. Moore.....	Veterinarian
C. Larsen.....	Dairy Husbandry
Clifford Willis.....	Agronomist
Robert Matheson.....	Entomologist
A. E. Koch.....	Assistant in Chemistry
J. V. Bopp .....	Chief Assistant in Agronomy
L. H. Lund.....	Assistant in Dairying
W. E. Joseph.....	Assistant in Animal Husbandry
A. R. Dutcher.....	Assistant in Chemistry
H. J. Besley.....	Assistant in Agronomy
R. A. Larson.....	Secretary and Accountant
B. B. Lawshe.....	Stenographer

Any resident of the State may have his name placed on the regular mailing list to receive the Bulletins of this Station free upon application to the Director.

# Annual Report of the Director of the Experiment Station

PRESIDENT R. L. SLAGLE, South Dakota State College of  
Agriculture and Mechanic Arts.

SIR :-

I have the honor to make the following report of the South Dakota Agricultural Experiment Station for the fiscal year ending June 30, 1908.

In submitting this, my seventh annual report, I am glad to state that the progress made by the Experiment Station as a whole has been very satisfactory. Never before has the Station had such a well equipped corps of scientists, while the funds at our command are inadequate to meet the demands made upon us from time to time by the farmers of this rapidly developing agricultural state, it is hoped that the time is not far distant when the state legislature will supplement the funds received from the federal government for original research work.

## The Staff

Several changes in the personnel of the Station staff were made during the year. Mr. Charles Haralson, assistant in Horticulture and Mr. H.G. Skinner, assistant in Animal Husbandry resigned early in the year to accept more lucrative positions. The vacancies caused by the resignation of Mr. W. A. Wheeler, Botanist and Entomologist, were filled by appointing Dr. E. W. Olive, Botanist and Robert A. Matheson, Entomologist.

Mr. Christian Larsen, formerly assistant in Dairying at the Iowa station was appointed chief of the Dairy division. At the beginning of the growing season Mr. John S. Cole,

who for several years had been assistant in Agronomy, resigned to accept a better paying position with the United States Department of Agriculture. Mr. Clifford Willis of the Illinois Experiment Station was appointed as Agronomist of the Station.

I repeat my recommendation of one year ago in regard to salaries received by men doing college and experiment station work. The salaries received at this Station are not equal to the salaries received at similar institutions in the adjoining states. This is a condition of affairs which should be remedied. The loss of a department chief or an assistant means a setback in the investigations of that department and a loss to the Station, as a whole, as it requires time for the successor to familiarize himself with conditions. They also have new ideas which require new equipment. I respectfully recommend that members of the Station force receive a salary which is at least an average of the compensation received by scientists in the same line of work at similar institutions in the adjoining states.

### The Work

With the exception of the addition of the Dairy Department the lines of investigation were the same as for last year, i. e., Agronomy, Animal Husbandry, Botany, Entomology, Chemistry, Horticulture and Veterinary.

At the close of the fiscal year Mr. N. E. Hansen, the Horticulturist was again sent to foreign countries by the United States Department of Agriculture as an agricultural explorer, to secure seeds and plants hardy for the Northwest.

Many of the new things imported one year ago promise well for our western conditions.

The Station co-operated with the federal government during the past year in the following lines: 1. In growing grains and forage plants; 2. In growing sugar beets; 3. In dipping cattle affected with mange.

1 The objects of co-operating in growing grains and forage plants are (1) to improve the wheat industry of the northern plains by discovering or producing varieties better than those now grown, especially with regard to nitrogen content, yield, earliness, drought-resistance, etc.; (2) to conduct similar experiments with oats, barleys, and other cereals; (3)



to determine the effect of changes of environment upon the growth of cereals, particularly the composition of the wheat kernel; (4) to produce by selection and hybridization improved varieties of forage and other crop plants, especially with a view to better adapting such plants to semi-arid regions, increasing their productiveness, drought-resistance and other desirable qualities; (5) to determine the best method of soil preparation and crop rotation for conservation of moisture and the maintenance of humus in the soil of the Great Plains Area.

2 The object of the co-operative experiment in growing sugar beets is to determine which varieties are best suited to the soil and the climatic conditions of South Dakota and also to increase the yield of sugar per acre by selection.

3 In the spring of 1908 an experiment in dipping cattle was inaugurated to ascertain the effectiveness of the various dips for the eradication of the disease known as mange in cattle. This disease is quite prevalent in some sections of South Dakota. It is the intention to publish the results of this experiment during the spring of 1909.

In addition to these a co-operative experiment was undertaken during the spring of 1908 with the federal government in growing different varieties of alfalfa in various sections of the state to determine their hardiness and different habits of growth.

In each of these experiments the government furnishes part of the equipment or pays for part of the labor as the case may demand.

As a result of these co-operative experiments, lines of investigations are undertaken which would be prohibited by the Station with its limited funds.

### Sub-Stations

During the year there was one new sub-station established. This was located during the spring of 1908 at Eureka in the western part of McPherson county. Experiments in growing sod crops were begun immediately and the results will be of great value to the people of the northern section and the state as a whole, especially where similar conditions exist.

The buildings appropriated for by the last legislature for the Highmore sub-station have been completed. They not only comply with the needs at the station for the proper care of the grains but are an ornament to the farm. The work in crop rotation and testing forage crops has been continued the same as for last year.

### **Department of Animal Husbandry**

This department issued one bulletin during the year, i. e., "Stock Food for Pigs." This bulletin included the results obtained during the two years in feeding stock foods to the fattening pig. Early maturity is a desirable characteristic in any kind of livestock and if this feature can be brought about by feeding artificial compounds (other than are produced on the farm) their use must be considered a benefit rather than a detriment providing the cost is not prohibitive.

The results of the year's work with the experiment in breeding and feeding sheep and the experiment in originating a new breed of swine, were very satisfactory.

An experiment in feeding lambs to determine the relative value of alfalfa hay to prairie hay was completed and the results will be published soon.

The demand by the live stock men for the government vaccine for blackleg was greater than for last year, there being a total of over 15,000 doses sent out to residents of South Dakota.

### **Publications**

Five publications on the following subjects were issued during the year. No. 105, "Stock Food for Pigs"; No. 106, "Sugar Beets in South Dakota"; No. 107, "Sheep Scab"; No. 108, "New Hybrid Fruits"; No. 109, "Rusts of Cereals and Other Plants."

Bulletin No. 105 includes results obtained during the past two years in feeding stock food to the fattening pig. The stock foods were fed in each case with a grain ration and were checked with a lot that received the same kind of a grain ration but no stock food.

The bulletin contains a chemical analysis of each food. It also includes the results obtained by feeding a home made stock food the formula for which was suggested by the Vet-

erinarian, E. L. Moore and the Chemist J. H. Shepard. The cost of the compound was about  $4\frac{1}{2}$  cents per pound or less than one-half the price of the commercial stock foods used. Even this preparation did not make as cheap a gain as when no stock food was fed. Each lot receiving stock food made a larger gain during the period of experiments than the lots that received no stock foods.

Bulletin No. 106 gives the results of an experiment in co-operation with the United States Department of Agriculture in growing sugar beets. The principal object of this work is to develop a better beet for factory purposes both as to quality and size. There were twenty-six varieties grown and analyzed by the chemists. These varieties varied greatly in their per cent of sugar and all under 14% were rejected.

In 1891 extensive preparations were made at this Station to give the sugar beet a thorough test in different localities in South Dakota. Seed was distributed to co-operators. Directions for culture were issued and reports were required from growers. The result was that beets were grown by the co-operators that tested from 12 to 18% of sugar.

This bulletin also gives results of sugar beet growing in South Dakota in 1892, 1897 and 1898. It contains the analysis of beets in several localities in the state and the author concludes after summing up work for several years that, "South Dakota can afford to await her day" referring to the probable time when sugar beet factories will be in operation in this state.

Bulletin 107, "Sheep Scab" includes the results obtained in a co-operative experiment with the United States Department of Agriculture in dipping sheep affected with scab. The object of this experiment was to determine the relative efficiency of the various constituents of coal-tar dips in the treatment of sheep scab, in order to provide some standard whereby the efficiency of these dips could be determined by laboratory methods.

A flock of infected sheep was purchased, divided up into small lots and each dipped with a separate dip.

These experiments have demonstrated that coal-tar dips, when properly prepared and diluted for use, contained cer-

tain percentages of coal-tar oil and cresylic acid, or a cresylic acid alone are effective remedies against sheep scab.

This bulletin also contains state and federal regulations to prevent the spread of sheep scab.

Bulletin 108, "New Hybrid Fruits" is a continuation of Bulletin 87 and 88 of this Station. It gives the results of originating some of the many new fruits under investigation at this Station. The improved native Sand Cherry at this Station amalgamates readily by hybridizing with some of the improved varieties. These new fruits are hardy and withstand the winters without protection.

Bulletin 109, "Rusts of Cereals and Other Plants," reports the results obtained at this Station and other stations in the United States. The author describes in detail the nature of this disease, gives its life history and suggests precautionary measures to assist in checking its spread.

Twenty-five thousand copies of each bulletin are printed and sent out to sixteen thousand addresses in the state, making an increase of over one thousand of that of last year. These bulletins are free to residents of the state.

The bulletins are sent in exchange for the following weekly and monthly publications:

#### FOREIGN

Agricultural Gazette, W. A. Gullick, South Wales.

Agricultural Journal of India, Thacker & Spink, Calcutta.

Agricultural Chemistry, Bangalore.

Abteilung fur Samenkontrolle, Hamburg.

Bureau of Science, Manila.

Boletim da Agricultura, San Paulo, Brazil.

Bulletin of the Lloyd Library of Botany, Pharmacy and Materia Medica, J. U. and C. G. Lloyd, Cincinnati, Ohio.

Bulletin of the Department of Agriculture, Kingston, Jamaica.

Division of Biology and Horticulture, Wellington.

Department of Agriculture, Victoria, Allen Morrison, Melbourne.

Die Landwirtschaftlichen Versuchs Stationen, Berlin.

El Agricultor Mexicano, C. J. Fuarez, Chic., Mexico.

Estacion Experimental Para cana. de agucai, Lima, Peru.

El Cultivo Del Triog, Buenos Aires.

- Hokaido Agricultural Expl. Sta., Sapporo, Japan.  
 Journal of the Department of Agriculture, Hussey & Gillingham, Adelaide.  
 Journal of the Department of Agriculture, Berlin.  
 Jahresbericht.  
 Les Orges Cullinees, Milan  
 Les Ravines Et Les Sables, Toulouse.  
 Natal Agricultural Journal and Mining Record, Maritzburg.  
 New Zeland Dairyman, Wellington, N. Z.  
 O Criador Pau lista, Sao Paulo, Brazil.  
 Rothamsted Experiment Station, Horpenen, London.

AMERICAN

- Agricultural Eptomist, Spencer, Ind.  
 American Farm World, Chicago, Ill.  
 American Fertilizer, Philadelphia, Pa.  
 American Home Magazine, New York City.  
 American Miller, Chicago, Ill.  
 American Sugar Industry, Chicago, Ill.  
 American Swineherd, Chicago, Ill.  
 Better Fruits, Hood River, Oregon.  
 Big Stone Headlight, Big Stone, S. D.  
 Cattle Specialist, Waukesha, Wis.  
 Children's Friend, Sioux Falls, S. D.  
 Circle, New York City.  
 Chicago Markets, Chicago, Ill.  
 Colman's Rural World, St. Louis, Mo.  
 Cotton Seed, Atlanta, Ga.  
 Dairy Record, St. Paul, Minn.  
 Dakota Farmer, Aberdeen, S. D.  
 Deutsch-American Farmer, Lincoln, Nebr.  
 Elgin Dairy Report, Elgin, Ill.  
 Farm and Real Estate Journal, Traer, Iowa.  
 Farm and Stock, St. Joseph, Mo.  
 Farm, Field and Fireside, Chicago, Ill.  
 Farm Folks, Kansas City, Mo.  
 Farm Journal, Philadelphia, Pa.  
 Farm Life, Chicago, Ill.  
 Farm Press, Chicago, Ill.  
 Farm Progress, St. Louis, Mo.



- Farm Star, Indianapolis, Ind.  
Farm, Stock and Home, Minneapolis, Minn.  
Farmer, The, St. Paul, Minn.  
Farmer and Breeder, Sioux City, Iowa.  
Farmers and Drovers' Journal, Union Stock Yards, Chicago, Ill.  
Farmers Guide, Huntington, Ind.  
Farmers Tribune, Sioux City, Iowa.  
Field and Farm, Denver, Colo.  
Flour and Feed, Milwaukee, Wis.  
Forestry & Irrigation, Washington, D. C.  
Fruit Grower, St. Joseph, Mo.  
Furrow, The, Iowa State College.  
Gospodarz, Omaha, Nebr.  
Hoard's Dairyman, Fort Atkinson, Wis.  
Holstein-Friesian World, Ithaca, N. Y.  
Homestead, Des Moines, Iowa.  
Hospodarske Listy, Chicago, Ill.  
Illuminated World Life, Minneapolis, Minn.  
Indian School Journal, Chilvick, Okla.  
Industrious Hen, Knoxville, Tenn.  
Jersey Bulletin, Indianapolis, Ind.  
Kimball's Dairy Farmer, Waterloo, Iowa.  
Kansas Farmer, Topeka, Kan.  
Lebanon Independent, Lebanon, S. D.  
Live Stock and Dairy Journal, San Francisco, Cal.  
Louisiana Planter, New Orleans, La.  
Metropolitan and Rural Home, New York City.  
Minnesota & Dakota Farmer, Brookings, S. D.  
Mitchell Republican, Mitchell, S. D.  
Modern Farmer, St. Joseph, Mo.  
Missouri Agricultural College Farmer, Columbia, Mo.  
National Farmer, Winona, Minn.  
National Geographic Magazine, Washington, D. C.  
National Grange, Philadelphia, Pa.  
National Stockman & Farmer, Chicago, Ill.  
Nebraska Farmer, Lincoln, Nebr.  
Northwestern Agriculturist, Minneapolis, Minn.  
Orange Judd Farmer, Chicago, Ill.  
Pacific Dairy Review, San Francisco, Cal.

Planter's Journal, Memphis, Tenn.  
 Poultry Husbandry, Waterville, N. Y.  
 Practical Dairyman, New York City.  
 Progressive Poultry Journal, Mitchell, S. D.  
 Pure-Products, New York City.  
 Reliable Poultry Journal, Quincy, Ill.  
 Rural New Yorker, New York City.  
 Sioux Valley News, Canton, S. D.  
 Spokesman Review, Spokane, Wash.  
 South Dakota Farmer, Sioux Falls, S. D.  
 Southern Farm Magazine, Baltimore, Md.  
 Successful Farming, Des Moines, Iowa.  
 Successful Poultry Journal, 355 Dearborn St., Chicago,

III.

Sugar Beet, Philadelphia, Pa.  
 Wallace's Farmer, Des Moines, Iowa.  
 Weekly Live Stock Report, Chicago, Ill.

For a more detailed statement of the work in each department of the Experiment Station I refer you to reports hereto attached.

In the Absence of N. E. Hansen, the Horticulturist, as aforementioned, there will be no report from that department for the year.

Yours very truly

JAMES W. WILSON,  
 Director and Animal Husbandman

# Financial Report

The South Dakota Agricultural Experiment Station  
In Account With  
The United States Appropriations 1907-1908

DR.		HATCH FUND	ADAMS FUND
To balance from appropriations for			
1906-1907 .....			
Receipts from the treasurer of the			
United States as per appropriations			
for fiscal year ending June 30, 1908,			
under acts of Congress approved			
March 2, 1887 (Hatch Fund) and			
March 16, 1906 (Adams Fund).....			
		\$15000 00	\$9000 00
CR			
By Salaries.. .....	6394 11	3330 07	
Labor.....	3212 75	3464 42	
Publications.....	1283 70		
Postage and stationery.....	367 83	8 00	
Freight and express.....	275 67	88 80	
Heat, light, water and power.....	1 71	40 01	
Chemical supplies .....	72 36	907 29	
Seeds, plants and sundry supplies..	513 91	359 51	
Fertilizers.....		18 80	
Feeding stuffs.....	1025 48	153 72	
Library .....	372 02	32 70	
Tools, implements and machinery..	116 80	289 63	
Furniture and fixtures.....	464 20		
Scientific apparatus .....	294 77	287 05	
Live stock .....	380 50	20 00	
Traveling expenses.....	185 93		
Contingent expenses.....	38 26		
Buildings and land.....			
Balance.....			
Total .....	\$15000 00	\$9000 00	

**Disbursements of Hatch and Adams Funds by Departments**

Department	Hatch Fund	Adams Fund
Agronomy.....	\$2277 16	\$1300 00
Botany.....	1130 33	00 00
Chemistry.....	551 12	1736 19
Executive.....	2378 35	00 00
Horticulture.....	2292 40	4420 00
Printing.....	1389 78	00 00
Veterinary.....	678 80	1543 81
Animal Husbandry.....	2691 00	
Entomology.....	499 90	
Dairy.....	1111 16	
	<hr/>	<hr/>
	\$15000 00	\$9000 00

**Receipts and Disbursements of Fund Received from Sales of Experiment Station Produce.**

## Receipts

On hand July 1, 1907.....	\$ 375 94
Received during the year .....	2496 69
	<hr/>
Total.....	\$ 2872 63

## Disbursements

Labor .....	\$1240 45
Publications .....	32 50
Postage and stationery.....	74 38
Freight and express.....	75 24
Seeds, plants and sundry supplies .....	720 89
Feeding stuffs.....	161 29
Tools, implements and machinery.....	16 75
Furniture and fixtures.....	101 50
Traveling expenses .....	107 55
Balance.....	342 08
	<hr/>
Total.....	\$2872 63

## Disbursement by Departments

Agronomy.....	\$ 567 48
Horticulture .....	1561 74
Animal Husbandry .....	198 97
Veterinary .....	202 36
Balance.....	342 08
	<hr/>
Total .....	\$2872 63

**Highmore Sub-Station**

## Receipts

Appropriation for buildings, etc.....	\$ 8000 00
Appropriation for maintenance.....	2000 00
From sales of produce.....	533 35
Total .....	<u>\$10533 35</u>

## Disbursements

Buildings, etc.....	\$ 7667 20
Salary and labor.....	1527 69
Machinery and repairs.....	198 14
Feed.....	34 05
Traveling expenses.....	135 19
Heat, light and power.....	32 15
Premium on insurance.....	76 00
Miscellaneous.....	197 22
Balance in building fund June 30, 1908.....	332 80
Balance in local fund June 30, 1908.....	332 91
Total .....	<u>\$10533 35</u>

**Experiment Sub-Station Fund**

## Receipts

From endowment lands.....	\$ 1046 30
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## Disbursements

## Eureka Station

Labor.....	\$ 282 11
Freight.....	16 78
Harrow.....	13 50
Posts and lumber.....	12 50
Traveling expenses.....	56 35
On hand June 30, 1908.....	665 06

Total .....	<u>\$ 1046 30</u>
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R. A. LARSON, Secretary.



**Department of Agronomy**

Director James W. Wilson,  
Brookings, S. Dak.

Dear Sir:—

In reply to your letter of July 22nd I have the honor to submit the following report for the fiscal year ending June 30th, 1908. The principal lines of work for the Department of Agronomy as in previous years were, rotation of crops, which was started in 1897, adaption and improvement of cereal and acclimatization tests and yields with forage plants. In addition to the work at Brookings, the Department of Agronomy has in charge the work at Highmore Sub-station. On the whole the year was favorable for experimental work. None of the crops suffered very much from the vicissitudes of climate. In general all crops were free from attacks of disease. The work at Highmore Sub-station was in co-operation with the Department of Agronomy. Three divisions of the Bureau of Plant Industry were represented, viz., Dry Land Agriculture, Dry Land Investigations and Plant Breeding for Drought and Alkali Resistance. The work is being carried on at this Sub-station the same as it was for the year 1907, with the exception of corn breeding. In April work was begun at the Eureka Sub-station. Forty (40) acres were broken from the prairie sod. The work at this point in the state consists in finding out which crop is the best to work back prairie sod and at the same time give the largest returns to the farmer. With this in view five (5) varieties of barley were sown in one series of three acres, two (2) acres of blue stem wheat were sown in another series, three (3) varieties of oats, one acre of each variety, were sown in another series. Four (4) varieties of durum wheat were sown in a fourth series of three acres. In the fifth series of three (3) acres, Minnesota No. 13 corn was planted. In the sixth series two (2) varieties of millet were sown. In the seventh series Minnesota No. 25 flax was sown. While in the eighth series, one acre was seeded to cane, one acre to common flax and one acre to flax grown at the Highmore Sub-station. The rainfall has been normal at this point in the state and the crops are doing nicely. The main objects which the department has in mind are: First, to maintain the produc-

tive capacity of the soil; Second, to find out the best grains adapted to the different sections of the state and Third, to improve these grains by selection and breeding.

With this in mind at the main station a complete fertility test was started on two acres of ground. One acre was seeded to barley, while the remaining one was seeded to wheat. Also a system of crop rotation to be considered in a broader way than a trial of variety combinations, but rather the effect of these rotations upon the maintenance of the fertility of the soil. Knowing that plants draw heavily upon the elements nitrogen, phosphorous and potassium, we have in each rotation a crop that will tend to keep up the necessary supply of nitrogen. The question is, which legume in the rotation will do this? We also have in mind the physical condition of the soil. In the work with forage crops which was transferred to the department in the spring of 1906, we are testing the value and adaptations of about sixty varieties of clovers and alfalfas, from different sources. Testing the value and permanency of different mixtures of clover, and alfalfa, with broom grass and timothy. We are doing some work with sorghums, cow peas, and have begun breeding work with alfalfa, medium red clover, broom grass and timothy.

Respectfully submitted,

CLIFFORD WILLIS,

Head of Department

### **Department of Botany and Entomology**

Director James W. Wilson,

South Dakota Agricultural Experiment Station, Brookings, S. D.

Dear Sir:-

I have the honor to submit the following summary of work done by the Botanical Department during the fiscal year ending June 30, 1908. The main lines of work included the study of current plant disease, particularly the rusts, the spraying of fruit trees, and the spraying with various chemicals for the eradication of weeds.

A large part of the time required of the Botanical department for experiment station work was devoted to correspondence in regard to plant diseases. Fully three-fourths

of the inquiries received were in regard to these diseases. On account of the evident importance of further information concerning fungous diseases in this state the department undertook some experiments last spring on the spraying of fruit trees. This preliminary work was necessarily very limited on account of the lack of an available experimental orchard.

Work was continued on certain intricate details of the life history of the rusts and a short bulletin was issued on the subject, the main purpose of which was to record the present status of our knowledge concerning those destructive diseases

In co-operation with the American Steel and Wire Company the Botanical department also carried on field experiments at Milbank, Aberdeen, Castlewood, Arlington and Brookings for the eradication of mustard and other weeds in grain fields. This work will be continued throughout the season and it is planned to issue a bulletin on this subject during the fall.

The Entomological work during the past year has been entirely in the hands of Mr. Matheson, whose report is herewith appended.

Respectfully submitted,

E. W. OLIVE, Botanist

**Department of Entomology**

Director James W. Wilson,  
Brookings, South Dakota.

Dear Sir:—

In compliance with Dr. Olive's request I beg leave to submit the following statement as to the work in Entomology carried on during the past year. Much of the time has been occupied in getting the department organized, gathering together the available literature and in answering correspondence which for the first year of this department's existence has been rather large.

As I am required to devote only one-quarter of my time to Experiment Station work, the amount of investigation which can be carried on under such conditions must, of necessity, be rather limited. However, some progress has been made in the life-history work, in gathering together informa-

tion concerning the distribution of insect pests and in spraying. The life-history work has been much delayed through the lack of equipment and a suitable insectary, and it has also been interrupted by teaching work and by the time spent in inspecting the nurseries of the state. It is to be hoped that the following year will see much greater progress.

Respectfully submitted,

ROBERT MATHESON,

Entomologist

### Department of Chemistry

Director James W. Wilson,

Dear Sir:—

I submit herewith the report of the Department of Chemistry of the South Dakota Agricultural Experiment Station for the fiscal year ending June 30, 1908.

The work of this department has been along two lines, viz., the determination of the digestion coefficients for the common grains, grasses and forage plants with ruminants. Sheep were used this year also. This work is a continuation of the work commenced two years ago. Most of the different feeds and fodders available in this state have now been investigated and when the work is completed, a bulletin will be issued the coming year.

It is now proposed to continue the same line of work with horses.

The second line of work is with sugar beets. The object of this work is to breed up a strain of beets that shall have a satisfactory tonnage per acre and also a high sugar content.

Twenty-three different varieties were sown last year and a large number of mother beets have been selected by analysis. This has entailed much work, but the results have been most gratifying. Exceptionally high sugar percentages have been obtained. These mother beets have been planted and promise fine seed.

Some varieties of stock beets have been grown also and they are to be used for cross breeding work in order to produce a larger yield if possible.

The results of this work are given in Bulletin No. 106 of this Station. Twenty-six other plantings have been made

this year including most of the varieties now used in commercial production in this country. A fine stand has been secured and the work is in every way prosperous.

It is hoped that sugar factories will be erected in this state in the near future.

Very respectfully,

JAMES H. SHEPARD,

Chemist

### **Department of Veterinary Medicine**

Director James W. Wilson,  
Experiment Station.

Sir :.

I have the honor to submit herewith the annual report of the department of Veterinary Medicine for the fiscal year ending June 30, 1908.

The co-operative experiments on sheep scab conducted with the United States Bureau of Animal Industry have been completed and furnish the basis for bulletin No. 107 issued by this department. The work upon "Lumpy Jaw" conducted under the provisions of the Adams Act is still in progress. A co-operative experiment with the Bureau of Animal Industry on the effect of coal-tar-dips in the treatment of scabies in cattle is now in progress. The work probably will be completed this ensuing year.

Very respectfully,

E. L. MOORE, Veterinarian

### **Department of Dairying**

Director James W. Wilson,  
Brookings, S. D.

Dear Sir :—

The experimental work in the Dairy Husbandry department began about Sept. 1, 1907, about ten months ago. Lack of funds and equipment prevented any extensive project from being started. Work was done and is now in progress principally on the relation of acidity of butter to its quality and on factors affecting the acidity of butter. In co-



operation with the chemistry department systematic efforts have been made to ascertain the chemical and physical properties of South Dakota butter made with a view of improvements.

In connection with operating the college factory and dairy herd, systems of record keeping have been inaugurated which in time will lead to valuable data.

Respectfully submitted,

C. LARSEN, Dairyman.

